

CLAIMS

1. Nail and screw system (1) for improving the fixation of proximal fractures of the humerus, including at least a humeral nail (10) to be inserted in a humeral shaft (9) and comprising at least a proximal transversal hole (6) for the passage of a corresponding locking screws (3), said screw (3) having a screw head (4) and a screw body (31);
5 wherein said transversal hole (6) has an internal partially threaded portion (28) and the corresponding screw (3) has an outside thread diameter smaller than the diameter of said at least one transversal hole (6) that receives such a screw, wherein said nail is cannulated and said transversal hole comprises a couple of opposite holes (6', 6'') on opposite wall of the cannulated nail (10) and the hole (6') closer to the screw head (4) includes said partially threaded portion (28).
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2. Nail and screw system according to claim 1, wherein said partially threaded portion (28) is a portion of nut screw.
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3. Nail and screw system according to claim 1, wherein said partially threaded portion (28) is a knurl portion.
4. Nail and screw system according to claim 1, wherein said screw body (31) is fully threaded with a constant pitch (p) and comprises threads (35) having a triangular cross-section profile.
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5. Nail and screw system according to claim 4, wherein said triangular cross-section profile has cusp or acute apex angles of 60°.
6. Nail and screw system according to claim 1, further including at least an intermediate plate element (15) inserted between said screw head (4) and the bone cortex surface (14) so that the head (4) is abutting against said plate (15).
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7. System according to claim 6, wherein said intermediate plate element (15) includes a slightly curved surface (16) to adhere substantially to the bone cortex surface (14).
- 30 8. System according to claim 6, wherein said intermediate plate element (15) comprises a couple of elongated arm portions (18, 19) that are inserted in an astride position on the screw body before the final fastening of the screw head (4).
9. System according to claim 8, wherein said elongated arm portions (18,

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A. G. MEST

19) present rounded ends.

10. System according to claim 6, wherein said intermediate plate element (15) comprises an enlarged portion (21) having at least a seat (22) for embracing at least a fragment fixation pin (23).
- 5 11. System according to claim 10, wherein said seat (22) is at least a hole (22) formed in said enlarged portion (20) of the intermediate plate element (15).
12. System according to claim 10, wherein said seat (22) is at least a hole (24) formed in at least one of said elongated arm portions (18, 19).
- 10 13. System according to claim 6, wherein said intermediate plate element (15) has a substantially rounded profile.
14. System according to claim 6, wherein said intermediate plate element (15) is an open washer integrally formed with a flange portion (21).
- 15 15. System according to claim 6, wherein a second intermediate plate element (15') is inserted between the screw head (4) of a second locking screw (3), passing through a second proximal hole (6) of the nail (10), and the bone cortex surface (14).
16. System according to claim 15, wherein said second intermediate plate element (15') is larger than a first intermediate plate element (15):
- 20 17. System according to claim 15, wherein said second intermediate plate element (15) comprises a couple of elongated arm portions (18, 19) that are inserted in an astride position on the corresponding screw body.

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